UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte KIMBLE DONG and DATONG CHEN

Appeal No. 2005-2624
Application No. 09/399,510

ON BRIEF

Before BLANKENSHIP, SAADAT and NAPPI, Administrative Patent Judges.
SAADAT, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal from the Examiner's final rejection of claims 1-3, 6, 7, and 10.

We reverse.

BACKGROUND

Appellants' invention relates to an auto black expansion and automatic gain control system in an image sensor.

An understanding of the invention can be derived from a reading of exemplary independent claim 1, which is reproduced as follows:

1. A method for auto black expansion in an image sensor, comprising:

(a) comparing the voltage level of processed pixel signals with a first set voltage level;
(b) maintaining a first count of a number of pixel signals that are above or below the first set voltage level;
(c) using the count to determine a first digital control signal for adjusting the black level calibration of the processed pixel signals; and
(d) comparing the pixel signals to a second set voltage level different from said first set voltage level and maintaining a second count related to the comparison of the pixel signals to the second level, wherein the second count is used to determine a second digital control signal for adjusting the amplification of the processed pixel signals.

The Examiner relies on the following prior art reference:

Kim et al. (Kim) 6,597,395 Jul. 22, 2003

Claims 1, 2, 6, 7, and 10 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Kim.

Claim 3 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim.

Rather than reiterate the opposing arguments, reference is made to Appellants' brief (filed September 29, 2004) and the Examiner's answer (mailed December 1, 2004) for their respective positions. Only those arguments actually made by Appellants in the brief have been considered in this decision.

Arguments which Appellants could have made but chose not to make have not been considered (37 CFR § 41.37(c)(1)(vii)).

OPINION

Regarding claim 1, Appellants initially argue (brief, page 4) that Kim does not disclose the comparison of an individual pixel of an image to a threshold level, but rather an entire digital image to a voltage reference. The Examiner responds by asserting (answer, page 15) that the phrase "comparison of an individual pixel" is not claimed and that an image frame, as a whole or an entire digital image, is comprised of a plurality of individually processed pixel signals.

We agree with the Examiner's position for two reasons. First, as asserted by the Examiner, the claim language does not limit the pixel comparison to "individual pixels" as argued by Appellants. Thus, even by comparing a whole image, each individual pixel within that image is compared. Second, Kim does disclose (Figure 1) comparing processed pixel signals. The image signal appears to be converted from analog to digital form via A/D converter 210. This creates discrete voltage values for each individual pixel, which are then compared to the black level calibration value B within comparator 230. If the processed image was represented by only a single voltage value that was

being compared to black level calibration value B, counter 240 would not be necessary. Thus, Kim discloses comparing the voltage level of processed pixel signals with a reference voltage.

Appellants further argue (brief, page 5) that Kim does not disclose modifying the automatic gain control using a comparison to a second set voltage level "independent and not based on" the first set voltage level. Appellants contend (brief, page 5) that the selected "divided voltage value" within the D/A converter 250, which the Examiner (answer, page 5) equates to the second set voltage level, is the analog version of the digital signal input into the D/A converter 250 and is thus not different and "unrelated from" the first set voltage level B.

In response, the Examiner argues (answer, page 16) that the phrase "independent and not based on" and the phrase "unrelated from" are not stated in the claim language. The Examiner further argues (answer, page 17) that the second set voltage level (i.e. "divided voltage value") is not the "analog version of the digital signal input into the D/A converter 250," but rather a selected value from a plurality of voltage values based upon the n-bit digital control signal that is outputted by up/down counter 240. Lastly, the Examiner states (answer, page 17) that D/A

converter 250 outputs the second set voltage level into black level clamp circuit 260, wherein the processed image is clamped and fed back into CDS/AGC circuit 200.

We do not agree with the Examiner's position. Kim (Figure 1) does disclose two different voltage levels: a first set voltage level (B) and a second set voltage level (selected "divided voltage value"). Kim does not, however, disclose modifying the automatic gain control using a comparison to a second set voltage level. The second set voltage level is used for converting the digital n-bit control signal from counter 240 to an analog signal, which is then applied to black level clamp circuit 260 as a reference voltage (Kim, column 5, lines 5-10.) Black level clamp circuit 260 adjusts the black level of the analog image signal received from CDS/AGC circuit 200 and feeds back the resultant value to CDS/AGC circuit 200. In other words, black level clamp circuit 260 does not compare the processed pixel signals to the second set voltage level but rather adjusts the corresponding analog image to compensate for its black level. Although, as asserted by the Examiner, the claim language does not require that the first and second set voltage levels be "independent and not based on" one another or "unrelated", but rather only that they are different, Kim does not disclose

comparing the pixel signals to a different second set voltage level.

Lastly, Appellants argue (brief, page 5) that Kim does not disclose adjusting the automatic gain control block based upon the use of a second counter. Appellants contend (brief, page 6) that Kim discloses (column 5, lines 5-15) that black level clamp circuit 260 only clamps the black level of CDS/AGC circuit 200 and does not vary its automatic gain control.

The Examiner argues (answer, pages 17-18) that a second count is maintained by counter 240 which is used to adjust the automatic gain control.

> In other words, the first count is used to generate the n-bit control signal so as to generate the second set voltage level. The Black Level Clamp Circuit (260) clamps the black level in the processed pixel signals to the second set voltage level. The resultant clamped signal is fed back to the CDS/AGC (200) to become new processed pixel signals. The new processed pixel signals are compared in the Digital Comparator (230) so as to establish a second count relating to the comparison of the processed pixel signals to the second level. Since, the new processed pixel signals are dependent upon the comparison in the Black Level Clamp Circuit (260) to the second set voltage level, the second count using the new processed pixel signals in the Up/Down Counter (240) is "related to the comparison."
> (Answer, pages 6-7).

Thus, the Examiner's position (answer, page 16) is that as with the first count, the second count is used to determine a second

digital control signal that inputs into black level clamp circuit 260, wherein black level clamp circuit 260 clamps the processed image and feeds the clamped signal back into CDS/AGC circuit 200.

We again remain unconvinced with this position taken by the Examiner. As stated above, Kim does not disclose comparing the processed pixel signals to a second set voltage level. Thus, there can be no associated count related to that comparison. Assuming, however, for the purpose of argument, that Kim does disclose this limitation, Kim still does not disclose maintaining a second count related to that comparison. Up/Down counter 240 raises or lowers a present count value in accordance with an output signal of digital comparator 230, which compares a black level of the processed pixels with a first set voltage value B. Although the processed pixels in the second feedback loop may have been previously adjusted based on the second set voltage level, up/down counter 240 still only depends on a comparison to the first set voltage level. There is only one counter (up/down counter 240) that counts the results of one comparison. Thus, Kim does not disclose adjusting the automatic gain control block based upon the use of a second counter.

As the Examiner has failed to provide a prima facie case of obviousness, the 35 U.S.C. § 102(e) rejection of independent

claim 1, as well as independent claim 7, which includes limitations related to the second comparator and counter, and claims 2, 6[1] and 10, dependent thereon, is not sustained.

Regarding the 35 U.S.C. § 103 rejection of claim 3, which is dependent upon claim 1, we note that the modification proposed by the examiner (answer, sentence bridging pages 11-12) fails to overcome the deficiency of Kim with respect to the base claim 1. Accordingly, we do not sustain the 35 U.S.C. § 103 rejection of claim 3.

1 We note that claim 6, as it currently reads in Appendix A, is dependent on canceled claim 5. We recommend that both Appellant and the Examiner provide the necessary amendment to the claims to correct the dependency of claim 6. For purposes of this appeal, we assume that its dependency was intended to be based on one of claims 1-3.

CONCLUSION

In view of the forgoing, the decision of the Examiner rejecting claims 1, 2, 6, 7, and 10 under 35 U.S.C. § 102 and claim 3 under 35 U.S.C. § 103 is reversed.

REVERSED

HOWARD B. BLANKENSHIP)
Administrative Patent Judge)
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MAHSHID D. SAADAT) BOARD OF PATENT
Administrative Patent Judge) APPEALS
) AND
) INTERFERENCES
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ROBERT E. NAPPI)
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